



FCC RF Test Report

APPLICANT : Motorola Solutions Inc.
EQUIPMENT : NITRO Portable
BRAND NAME : Motorola Solutions
MODEL NAME : EVOLVE
MODEL NUMBER : HK2136A
FCC ID : AZ489FT7134
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on May 26, 2020 and testing was completed on Sep. 05, 2020. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China



TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer.....	5
1.3 Product Feature of Equipment Under Test.....	5
1.4 Product Specification of Equipment Under Test.....	6
1.5 Modification of EUT	6
1.6 Specification of Accessory.....	7
1.7 Testing Location	8
1.8 Test Software.....	8
1.9 Applicable Standards.....	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Carrier Frequency and Channel	9
2.2 Test Mode.....	10
2.3 Connection Diagram of Test System.....	12
2.4 Support Unit used in test configuration and system	13
2.5 EUT Operation Test Setup	13
2.6 Measurement Results Explanation Example.....	13
3 TEST RESULT	14
3.1 26dB & 99% Occupied Bandwidth Measurement	14
3.2 Maximum Conducted Output Power Measurement	16
3.3 Power Spectral Density Measurement	18
3.4 Frequency Stability Measurement.....	21
3.5 Unwanted Emissions Measurement.....	22
3.6 AC Conducted Emission Measurement.....	27
3.7 Automatically Discontinue Transmission	29
3.8 Antenna Requirements.....	30
4 LIST OF MEASURING EQUIPMENT	31
5 UNCERTAINTY OF EVALUATION	32
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT	
APPENDIX C. RADIATED SPURIOUS EMISSION	
APPENDIX D. DUTY CYCLE PLOTS	
APPENDIX E. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR052616D	Rev. 01	Initial issue of report	Oct. 22, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.5	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 6.23 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 13.53 dB at 2.779 MHz
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Motorola Solutions Inc.

8000 West Sunrise Boulevard, Fort Lauderdale, Florida

1.2 Manufacturer

Motorola Solutions Malaysia Sdn. Bhd.

Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	NITRO Portable
Brand Name	Motorola Solutions
Model Name	EVOLVE
Model Number	HK2136A
FCC ID	AZ489FT7134
EUT supports Radios application	WCDMA/LTE/GNSS WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11a/n HT20/HT40 Bluetooth BR/EDR/LE
IMEI Code	Conducted: 354850210002903/354850210002908 Conduction: 354850210004859/354850215004854 Radiation: 354850210004800/354850215004805
HW Version	P2.0
SW Version	IQN5000-userdebug 10 QKQ1.200405.002 D01.00.17 test-keys
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz
Maximum Output Power to Antenna	<5180 MHz ~ 5240 MHz> 802.11a : 13.38 dBm / 0.0218 W 802.11n HT20 : 12.35 dBm / 0.0172 W 802.11n HT40 : 10.91 dBm / 0.0123 W <5260 MHz ~ 5320 MHz> 802.11a : 13.40 dBm / 0.0219 W 802.11n HT20 : 12.38 dBm / 0.0173 W 802.11n HT40 : 10.81 dBm / 0.0121 W <5500 MHz ~ 5720 MHz > 802.11a : 13.68 dBm / 0.0233 W 802.11n HT20 : 12.44 dBm / 0.0175 W 802.11n HT40 : 11.01 dBm / 0.0126 W
99% Occupied Bandwidth	<5180 MHz ~ 5240 MHz> 802.11a : 17.48 MHz 802.11n HT20 : 18.73 MHz 802.11n HT40 : 36.56 MHz <5260 MHz ~ 5320 MHz> 802.11a : 17.48 MHz 802.11n HT20 : 18.68 MHz 802.11n HT40 : 36.56 MHz <5500 MHz ~ 5720 MHz > 802.11a : 17.48 MHz 802.11n HT20 : 18.73 MHz 802.11n HT40 : 36.66 MHz
Antenna Type / Gain	<5180 MHz ~ 5240 MHz> IFA Antenna with gain 3.0 dBi <5260 MHz ~ 5320 MHz> IFA Antenna with gain 3.0 dBi <5500 MHz ~ 5720 MHz> IFA Antenna with gain 2.0 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Specification of Accessory

Accessories Information				
AC Adapter1 (US) Micro-USB rapid-rate plug-in charger	Brand Name	Motorola	P/N	PS000150A11
	Power Rating	I/P: 100 - 240Vac, 0.25A, O/P: 5Vdc, 1.5A		
DC Adapter 2 Vehicular Power Adapter (VPA)	Brand Name	Motorola	P/N	PMPN4169A
	Power Rating	I/P: 10.8 – 33.0Vac, 1.1A, O/P: 5Vdc, 1.5A		
Wired Remote Speaker Mic	Brand Name	Motorola Solutions	P/N	PMMN4125B
	Signal Line	0.54 meter(normal), 2.5 meter (stretch) shielded cable, without ferrite core		
Bluetooth Wired Speaker Mic	Brand Name	Motorola Solutions	P/N	PMMN4127A
Bluetooth Earpiece	Brand Name	Motorola Solutions	P/N	EP900
Earpiece	Brand Name	Motorola Solutions	P/N	PMLN8191A
	Signal Line	1.128meter, non-shielded cable, without ferrite core		
Battery 1	Brand Name	Motorola Solutions	P/N	BT000593A01
	Rated	5800mAh		
Battery 2	Brand Name	Motorola Solutions	P/N	BT000592A01
	Rated	2900mAh		
Belt Clip Holster	Brand Name	Motorola Solutions	Model Name	PMLN6970A
Belt Clip Holster (Long)	Brand Name	Motorola Solutions	Model Name	NTN8266B
Belt Clip Holster (Short)	Brand Name	Motorola Solutions	Model Name	PMLN7965A

1.7 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24a1
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	-	-		
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	-	-		
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500-5720 MHz Band 3 (U-NII-2C)	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	-	-	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	-	-	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	-	-	144	5720
	142*	5710		

Note: The above Frequency and Channel in "*" were 802.11n HT40.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band 5 Link + Bluetooth Link + WLAN Link (2.4G) + Charging from Adapter1 + Earphone + Battery 1
Remark: For Radiated Test Cases, The tests were performed with Adapter 1 and Earphone.	



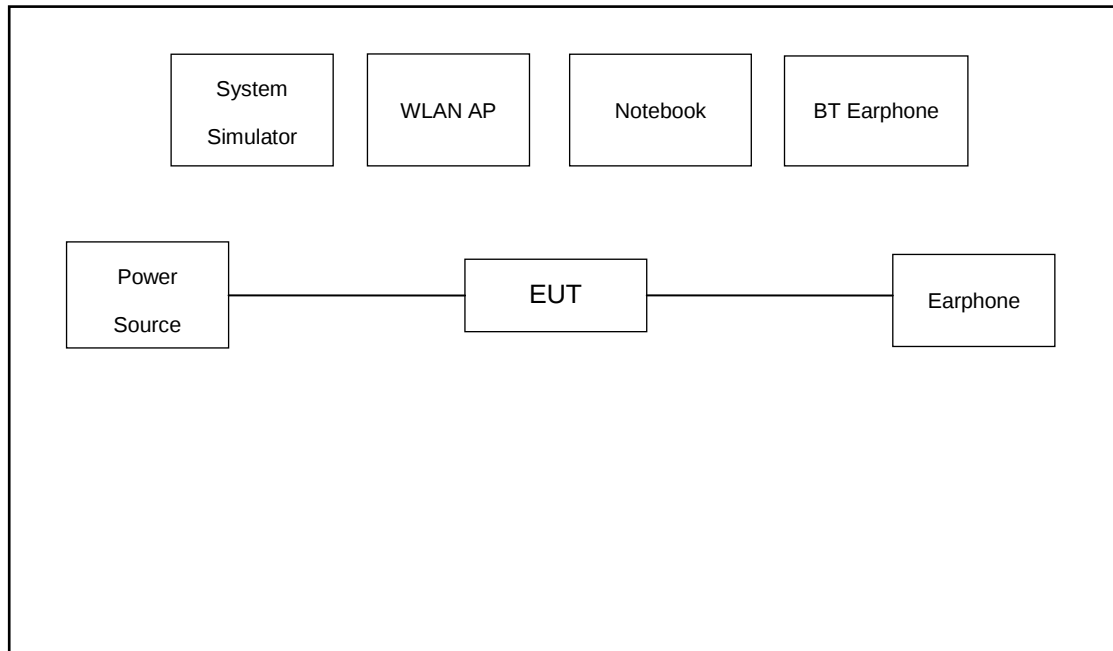
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

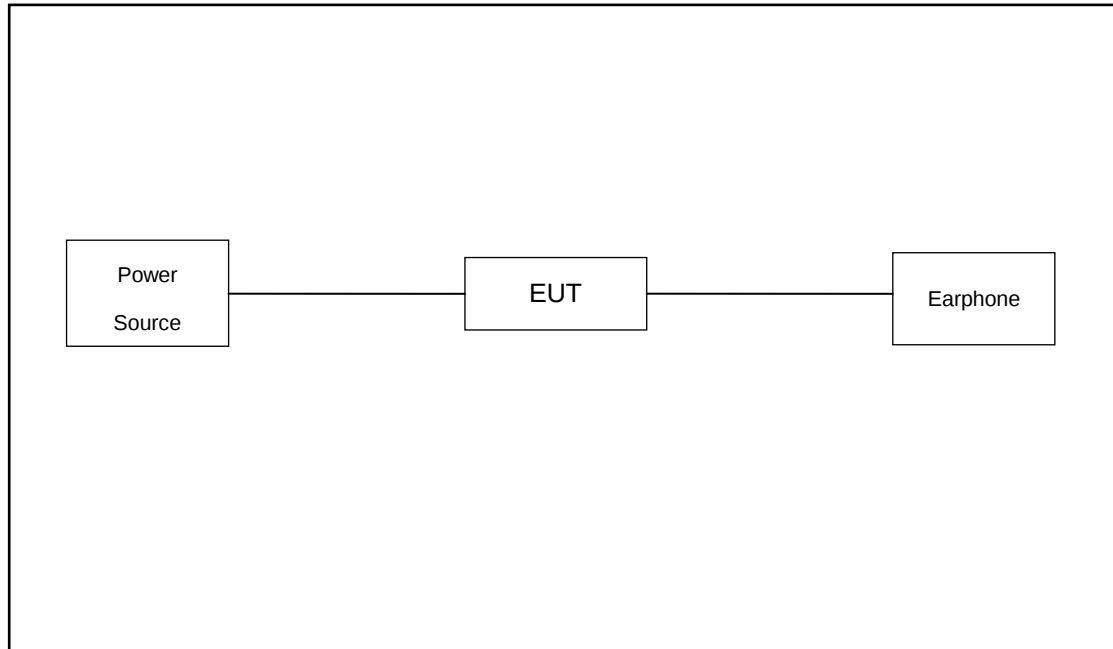
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

2.3 Connection Diagram of Test System

For Conducted Emission:



For Radiated Emission:



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded, 1.8m
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.9 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} \\ &= 6.9 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

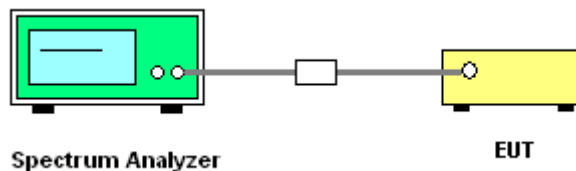
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

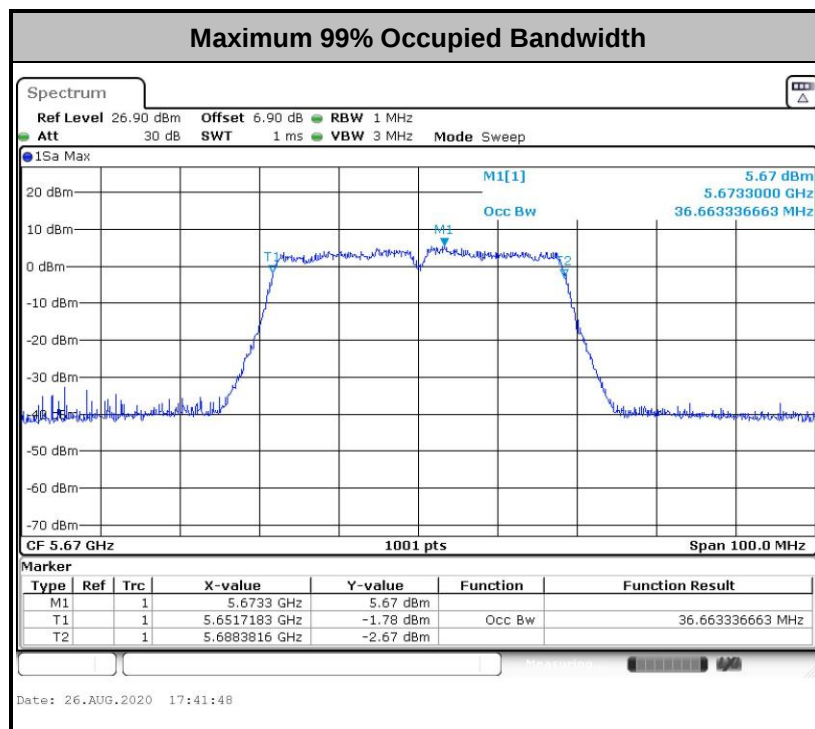
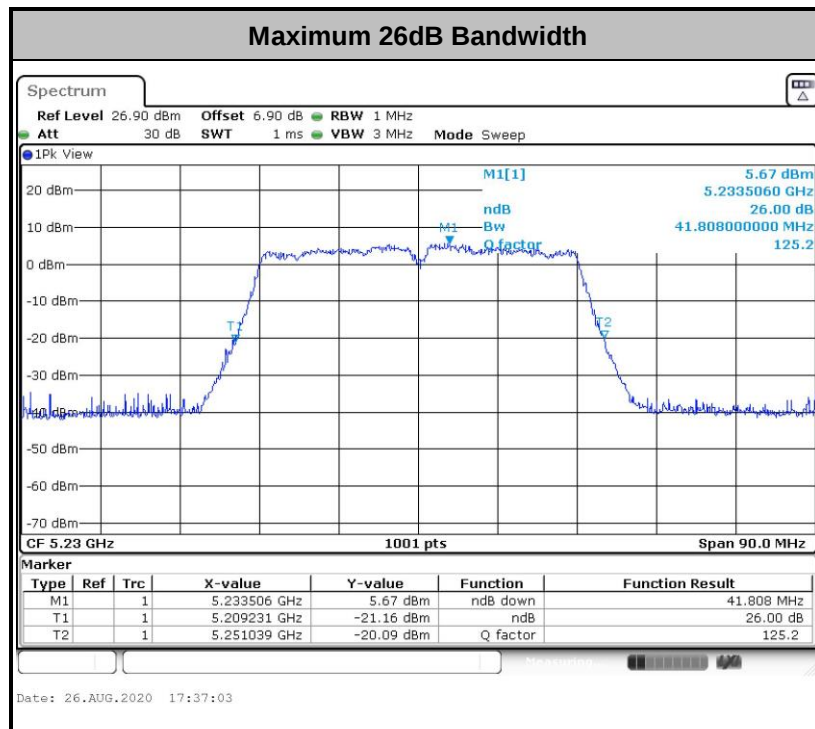
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) $\geq 3 * \text{RBW}$.
8. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm $10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

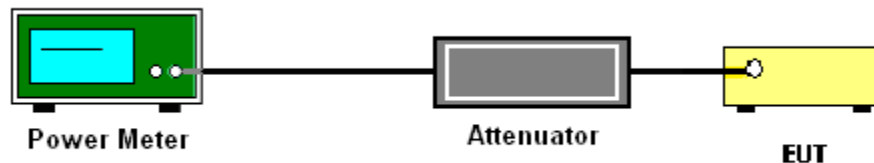
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

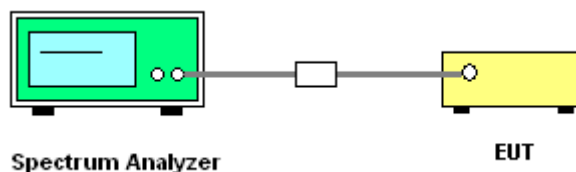
Section F) Maximum power spectral density.

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

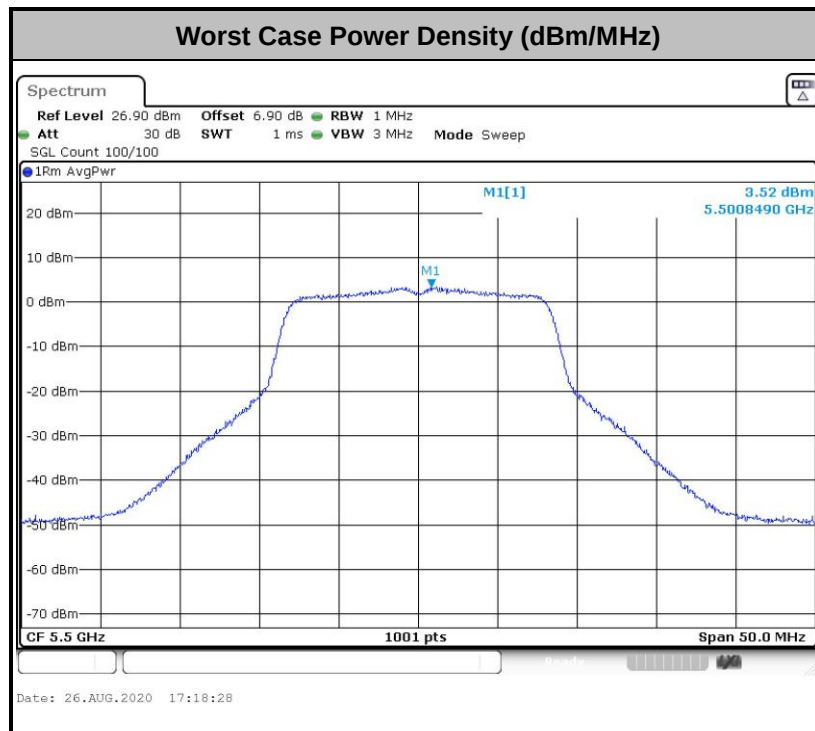
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW $\geq$ 3 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
-
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Frequency Stability Measurement

3.4.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

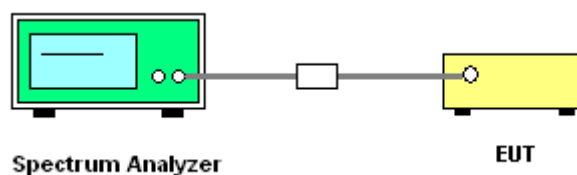
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.4.4 Test Setup



3.4.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.5 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.5.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.3

Note: The following formula is used to convert the EIRP to field strength.

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

3.5.2 Measuring Instruments

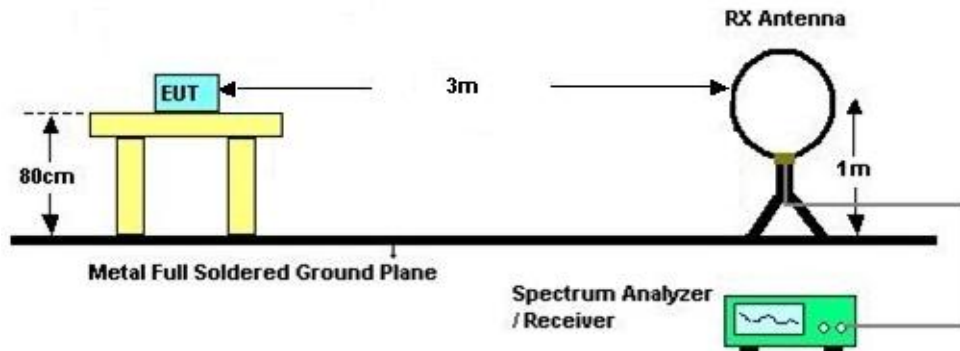
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

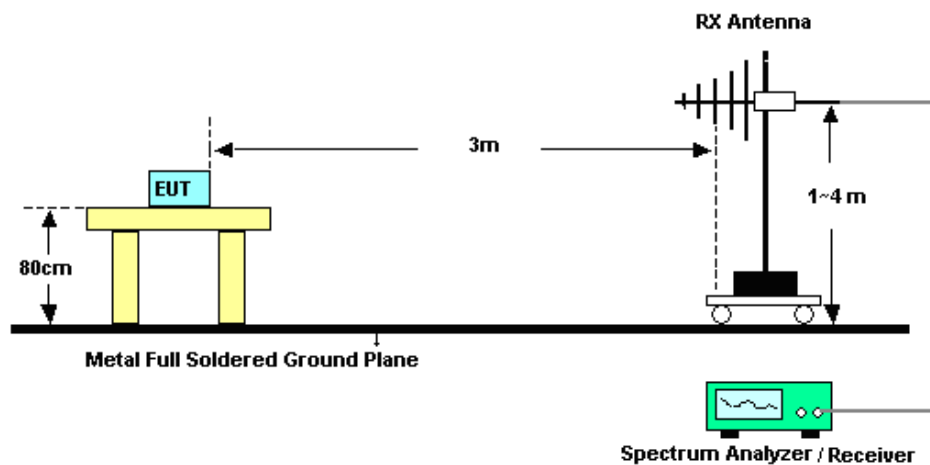
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.5.4 Test Setup

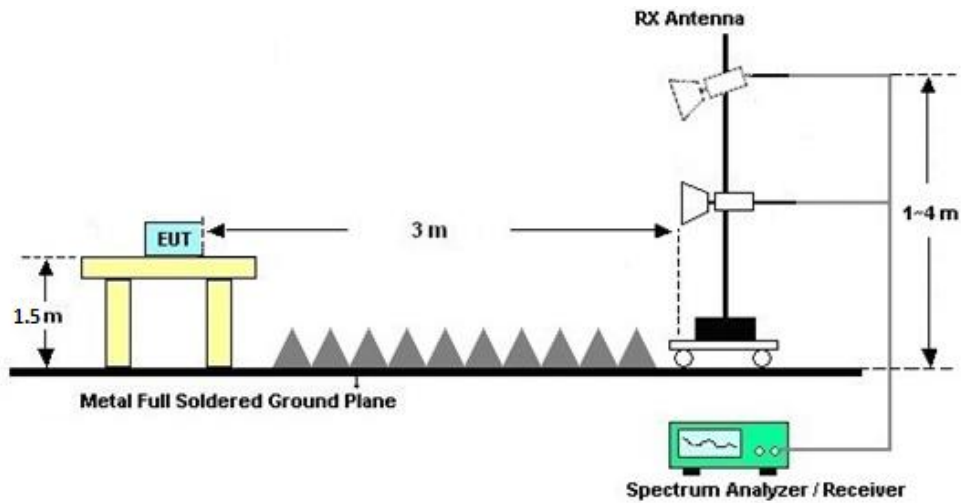
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

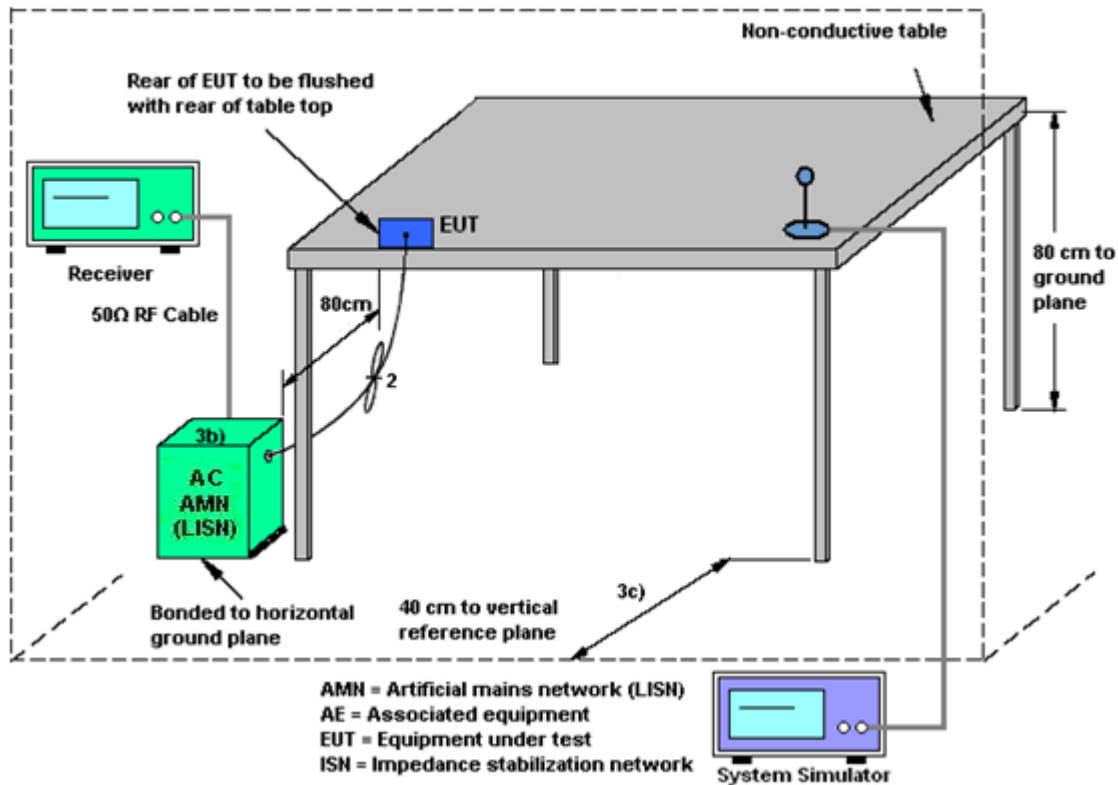
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.8 Antenna Requirements

3.8.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 02, 2019	Aug. 26, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 15, 2020	Aug. 26, 2020	Jan. 14, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Aug. 26, 2020	Jan. 07, 2021	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 03, 2020	Aug. 26, 2020	Jul. 02, 2021	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 18, 2019	Sep. 05, 2020	Oct. 17, 2020	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz~44GHz	Apr. 15, 2020	Sep. 05, 2020	Apr. 14, 2021	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Sep. 05, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz~1GHz	May 29, 2020	Sep. 05, 2020	May 28, 2021	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2020	Sep. 05, 2020	Apr. 26, 2021	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Sep. 05, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 14, 2020	Sep. 05, 2020	Apr. 13, 2021	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Sep. 05, 2020	Jan. 07, 2021	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 02, 2020	Sep. 05, 2020	Jan. 01, 2021	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2020	Sep. 05, 2020	Apr. 14, 2021	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 05, 2020	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 05, 2020	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 05, 2020	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 14, 2020	Sep. 03, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Sep. 03, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Sep. 03, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Sep. 03, 2020	Oct. 17, 2020	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.94dB
---	--------

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------



Appendix A. Conducted Test Results

Report Number : FR052616D

Test Engineer:	Lex Wu	Temperature:	21~25	°C
Test Date:	2020/8/26	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)		
11a	6Mbps	1	36	5180	17.38	22.78	-	22.40		
11a	6Mbps	1	44	5220	17.48	23.33	-	22.43		
11a	6Mbps	1	48	5240	17.43	23.13	-	22.41		
HT20	MCS0	1	36	5180	18.68	23.73	-	22.71		
HT20	MCS0	1	44	5220	18.68	24.33	-	22.71		
HT20	MCS0	1	48	5240	18.73	24.88	-	22.73		
HT40	MCS0	1	38	5190	36.56	41.45	-	23.01		
HT40	MCS0	1	46	5230	36.56	41.81	-	23.01		

TEST RESULTS DATA
Average Power Table

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.09	13.33	24.00	3.00		Pass
11a	6Mbps	1	44	5220	0.09	13.28	24.00	3.00		Pass
11a	6Mbps	1	48	5240	0.09	13.38	24.00	3.00		Pass
HT20	MCS0	1	36	5180	0.06	12.35	24.00	3.00		Pass
HT20	MCS0	1	44	5220	0.06	12.24	24.00	3.00		Pass
HT20	MCS0	1	48	5240	0.06	12.27	24.00	3.00		Pass
HT40	MCS0	1	38	5190	0.16	10.91	24.00	3.00		Pass
HT40	MCS0	1	46	5230	0.16	10.88	24.00	3.00		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.09	2.92	11.00	3.00		Pass
11a	6Mbps	1	44	5220	0.09	2.59	11.00	3.00		Pass
11a	6Mbps	1	48	5240	0.09	2.89	11.00	3.00		Pass
HT20	MCS0	1	36	5180	0.06	1.86	11.00	3.00		Pass
HT20	MCS0	1	44	5220	0.06	1.61	11.00	3.00		Pass
HT20	MCS0	1	48	5240	0.06	1.78	11.00	3.00		Pass
HT40	MCS0	1	38	5190	0.16	-2.74	11.00	3.00		Pass
HT40	MCS0	1	46	5230	0.16	-2.75	11.00	3.00		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	52	5260	17.48	23.33	23.43	29.43	23.98	
11a	6M bps	1	60	5300	17.48	23.43	23.43	29.43	23.98	
11a	6M bps	1	64	5320	17.48	23.48	23.43	29.43	23.98	
HT20	MCS 0	1	52	5260	18.63	24.48	23.70	29.70	23.98	
HT20	MCS 0	1	60	5300	18.68	24.83	23.71	29.71	23.98	
HT20	MCS 0	1	64	5320	18.63	24.23	23.70	29.70	23.98	
HT40	MCS 0	1	54	5270	36.56	41.27	23.98	30.00	23.98	
HT40	MCS 0	1	62	5310	36.46	41.45	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.09	13.40	23.98	3.00	26.99	Pass
11a	6M bps	1	60	5300	0.09	13.27	23.98	3.00	26.99	Pass
11a	6M bps	1	64	5320	0.09	13.12	23.98	3.00	26.99	Pass
HT20	MCS 0	1	52	5260	0.06	12.38	23.98	3.00	26.99	Pass
HT20	MCS 0	1	60	5300	0.06	12.22	23.98	3.00	26.99	Pass
HT20	MCS 0	1	64	5320	0.06	12.33	23.98	3.00	26.99	Pass
HT40	MCS 0	1	54	5270	0.16	10.74	23.98	3.00	26.99	Pass
HT40	MCS 0	1	62	5310	0.16	10.81	23.98	3.00	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)		Pass/Fail
11a	6M bps	1	52	5260	0.09	2.81	11.00	3.00		Pass
11a	6M bps	1	60	5300	0.09	2.82	11.00	3.00		Pass
11a	6M bps	1	64	5320	0.09	2.59	11.00	3.00		Pass
HT20	MCS 0	1	52	5260	0.06	1.73	11.00	3.00		Pass
HT20	MCS 0	1	60	5300	0.06	1.78	11.00	3.00		Pass
HT20	MCS 0	1	64	5320	0.06	1.52	11.00	3.00		Pass
HT40	MCS 0	1	54	5270	0.16	-2.43	11.00	3.00		Pass
HT40	MCS 0	1	62	5310	0.16	-3.25	11.00	3.00		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	100	5500	17.43	23.13	23.41	29.41	23.98	
11a	6M bps	1	116	5580	17.43	23.48	23.41	29.41	23.98	
11a	6M bps	1	140	5700	17.38	23.08	23.40	29.40	23.98	
11a	6Mbps	1	144	5720	17.48	23.68	23.43	29.43	23.98	
HT20	MCS 0	1	100	5500	18.63	24.58	23.70	29.70	23.98	
HT20	MCS 0	1	116	5580	18.73	23.93	23.73	29.73	23.98	
HT20	MCS 0	1	140	5700	18.63	24.58	23.70	29.70	23.98	
HT20	MCS0	1	144	5720	18.63	25.03	23.70	29.70	23.98	
HT40	MCS 0	1	102	5510	36.46	41.72	23.98	30.00	23.98	
HT40	MCS 0	1	110	5550	36.46	41.72	23.98	30.00	23.98	
HT40	MCS 0	1	134	5670	36.66	41.72	23.98	30.00	23.98	
HT40	MCS0	1	142	5710	36.46	41.72	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

FCC Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	0.09	13.67	23.98	3.00	26.99	Pass
11a	6M bps	1	116	5580	0.09	13.68	23.98	3.00	26.99	Pass
11a	6M bps	1	140	5700	0.09	13.58	23.98	3.00	26.99	Pass
11a	6Mbps	1	144	5720	0.09	13.47	23.98	3.00	26.99	Pass
HT20	MCS 0	1	100	5500	0.06	12.37	23.98	3.00	26.99	Pass
HT20	MCS 0	1	116	5580	0.06	12.38	23.98	3.00	26.99	Pass
HT20	MCS 0	1	140	5700	0.06	12.35	23.98	3.00	26.99	Pass
HT20	MCS0	1	144	5720	0.06	12.44	23.98	3.00	26.99	Pass
HT40	MCS 0	1	102	5510	0.16	10.92	23.98	3.00	26.99	Pass
HT40	MCS 0	1	110	5550	0.16	11.01	23.98	3.00	26.99	Pass
HT40	MCS 0	1	134	5670	0.16	10.98	23.98	3.00	26.99	Pass
HT40	MCS0	1	142	5710	0.16	10.71	23.98	3.00	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)		Pass/Fail
11a	6M bps	1	100	5500	0.09	3.61	11.00	3.00		Pass
11a	6M bps	1	116	5580	0.09	3.00	11.00	3.00		Pass
11a	6M bps	1	140	5700	0.09	3.24	11.00	3.00		Pass
11a	6Mbps	1	144	5720	0.09	2.55	11.00	3.00		Pass
HT20	MCS 0	1	100	5500	0.06	1.48	11.00	3.00		Pass
HT20	MCS 0	1	116	5580	0.06	1.63	11.00	3.00		Pass
HT20	MCS 0	1	140	5700	0.06	1.84	11.00	3.00		Pass
HT20	MCS0	1	144	5720	0.06	1.61	11.00	3.00		Pass
HT40	MCS 0	1	102	5510	0.16	-2.77	11.00	3.00		Pass
HT40	MCS 0	1	110	5550	0.16	-3.03	11.00	3.00		Pass
HT40	MCS 0	1	134	5670	0.16	-2.79	11.00	3.00		Pass
HT40	MCS0	1	142	5710	0.16	-3.48	11.00	3.00		Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	60	3.85	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	-20	3.85	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	4.4	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	3.3	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	3.85	

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	60	3.85	
11a	6Mbps	1	64	5320	5319.975	-0.025	-4.70	-20	3.85	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	25	4.4	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	25	3.3	
11a	6Mbps	1	64	5320	5319.975	-0.025	-4.70	25	3.85	

Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	100	5500	5500.000	0.000	0.00	60	3.85	
11a	6Mbps	1	100	5500	5500.000	0.000	0.00	-20	3.85	
11a	6Mbps	1	100	5500	5500.000	0.000	0.00	25	4.4	
11a	6Mbps	1	100	5500	5500.000	0.000	0.00	25	3.3	
11a	6Mbps	1	100	5500	5500.000	0.000	0.00	25	3.85	

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N20	MCS0	1	36	5180	5180.000	0.000	0.00	60	3.85	
11N20	MCS0	1	36	5180	5180.000	0.000	0.00	-20	3.85	
11N20	MCS0	1	36	5180	5180.000	0.000	0.00	25	4.4	
11N20	MCS0	1	36	5180	5180.000	0.000	0.00	25	3.3	
11N20	MCS0	1	36	5180	5180.000	0.000	0.00	25	3.85	

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N20	MCS0	1	64	5320	5319.950	-0.050	-9.40	60	3.85	
11N20	MCS0	1	64	5320	5320.000	0.000	0.00	-20	3.85	
11N20	MCS0	1	64	5320	5320.000	0.000	0.00	25	4.4	
11N20	MCS0	1	64	5320	5319.975	-0.025	-4.70	25	3.3	
11N20	MCS0	1	64	5320	5320.000	0.000	0.00	25	3.85	

Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N20	MCS0	1	100	5500	5500.000	0.000	0.00	60	3.85	
11N20	MCS0	1	100	5500	5500.000	0.000	0.00	-20	3.85	
11N20	MCS0	1	100	5500	5499.950	-0.050	-9.09	25	4.4	
11N20	MCS0	1	100	5500	5500.000	0.000	0.00	25	3.3	
11N20	MCS0	1	100	5500	5500.000	0.000	0.00	25	3.85	

TEST RESULTS DATA
Frequency Stability

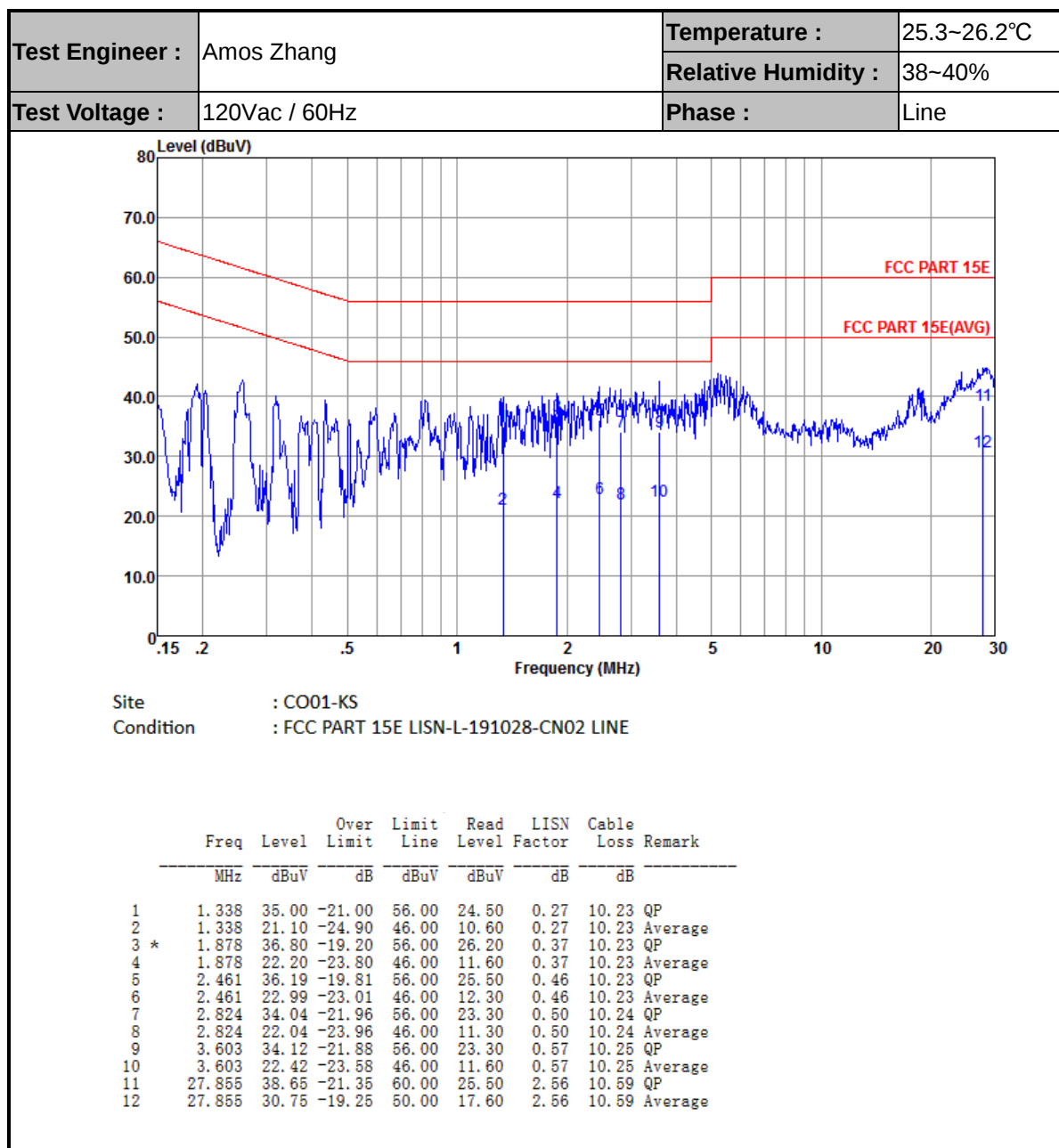
Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N40	6Mbps	1	38	5190	5190.050	0.050	9.63	60	3.85	
11N40	6Mbps	1	38	5190	5190.050	0.050	9.63	-20	3.85	
11N40	6Mbps	1	38	5190	5190.050	0.050	9.63	25	4.4	
11N40	6Mbps	1	38	5190	5190.050	0.050	9.63	25	3.3	
11N40	6Mbps	1	38	5190	5190.050	0.050	9.63	25	3.85	

Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N40	MCS0	1	62	5310	5310.050	0.050	9.42	60	3.85	
11N40	MCS0	1	62	5310	5310.050	0.050	9.42	-20	3.85	
11N40	MCS0	1	62	5310	5310.050	0.050	9.42	25	4.4	
11N40	MCS0	1	62	5310	5310.050	0.050	9.42	25	3.3	
11N40	MCS0	1	62	5310	5310.050	0.050	9.42	25	3.85	

Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11N40	MCS0	1	102	5510	5510.050	0.050	9.07	60	3.85	
11N40	MCS0	1	102	5510	5510.050	0.050	9.07	-20	3.85	
11N40	MCS0	1	102	5510	5510.000	0.000	0.00	25	4.4	
11N40	MCS0	1	102	5510	5510.050	0.050	9.07	25	3.3	
11N40	MCS0	1	102	5510	5510.000	0.000	0.00	25	3.85	

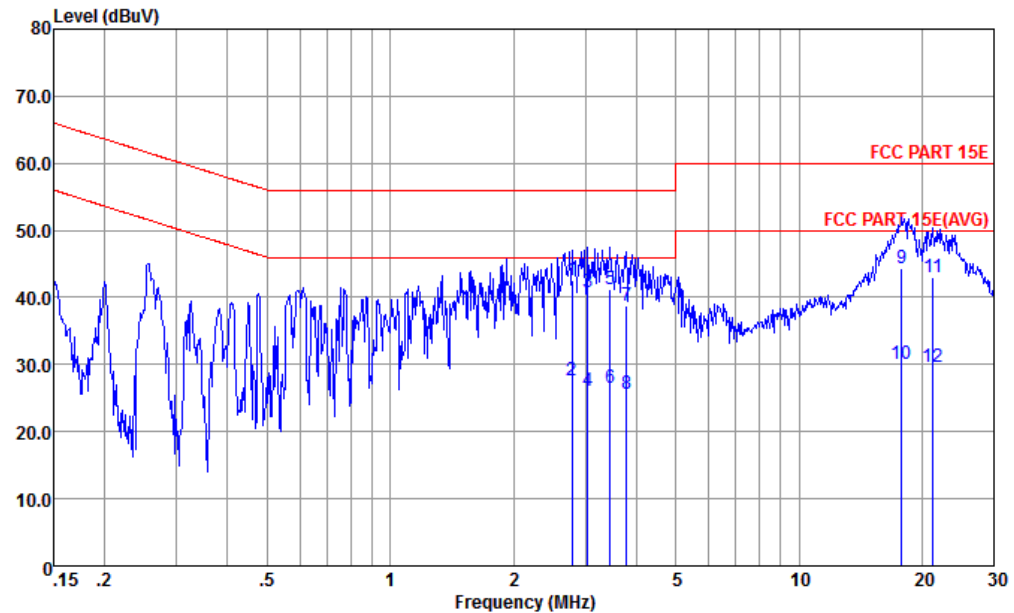


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1 *	2.779	42.47	-13.53	56.00	31.60	0.63	10.24	QP
2	2.779	27.67	-18.33	46.00	16.80	0.63	10.24	Average
3	3.041	40.80	-15.20	56.00	29.90	0.66	10.24	QP
4	3.041	26.00	-20.00	46.00	15.10	0.66	10.24	Average
5	3.454	41.15	-14.85	56.00	30.20	0.70	10.25	QP
6	3.454	26.45	-19.55	46.00	15.50	0.70	10.25	Average
7	3.779	38.78	-17.22	56.00	27.80	0.73	10.25	QP
8	3.779	25.58	-20.42	46.00	14.60	0.73	10.25	Average
9	17.849	44.40	-15.60	60.00	31.51	2.44	10.45	QP
10	17.849	30.10	-19.90	50.00	17.21	2.44	10.45	Average
11	21.260	43.04	-16.96	60.00	29.60	2.92	10.52	QP
12	21.260	29.64	-20.36	50.00	16.20	2.92	10.52	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5103.84	55.94	-18.06	74	42.69	35.28	11.3	33.33	102	258	P	H
		5146.08	45.75	-8.25	54	32.38	35.33	11.36	33.32	102	258	A	H
	*	5182	104.09	-	-	90.65	35.36	11.4	33.32	102	258	P	H
		5182	96.77	-	-	83.33	35.36	11.4	33.32	102	258	A	H
		5120.32	55.72	-18.28	74	42.43	35.3	11.32	33.33	100	229	P	V
		5147.36	45.76	-8.24	54	32.39	35.33	11.36	33.32	100	229	A	V
	*	5182	104.16	-	-	90.72	35.36	11.4	33.32	100	229	P	V
		5182	97.23	-	-	83.79	35.36	11.4	33.32	100	229	A	V

Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		10360	45.87	-22.43	68.3	52.52	39.6	15.83	62.08	300	0	P	H
		10360	45.78	-22.52	68.3	52.43	39.6	15.83	62.08	100	360	P	V
802.11a CH 44 5220MHz		10440	44.53	-23.77	68.3	51.06	39.63	15.89	62.05	100	360	P	H
		10440	45.07	-23.23	68.3	51.6	39.63	15.89	62.05	100	360	P	V
802.11a CH 48 5240MHz		10480	45.18	-23.12	68.3	51.6	39.66	15.94	62.02	100	360	P	H
		10480	44.7	-23.6	68.3	51.12	39.66	15.94	62.02	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		5118.72	54.43	-19.57	74	41.14	35.3	11.32	33.33	101	256	P	H
		5147.68	44.7	-9.3	54	31.33	35.33	11.36	33.32	101	256	A	H
	*	5176	100.87	-	-	87.43	35.36	11.4	33.32	101	256	P	H
		5176	93.69	-	-	80.25	35.36	11.4	33.32	101	256	A	H
		5105.92	55.04	-18.96	74	41.75	35.3	11.32	33.33	100	229	P	V
		5148	44.71	-9.29	54	31.34	35.33	11.36	33.32	100	229	A	V
	*	5182	102.02	-	-	88.58	35.36	11.4	33.32	100	229	P	V
		5182	94.24	-	-	80.8	35.36	11.4	33.32	100	229	A	V

Band 1 5150~5250MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	44.54	-23.76	68.3	51.19	39.6	15.83	62.08	100	360	P	H
		10360	44.51	-23.79	68.3	51.16	39.6	15.83	62.08	100	360	P	V
802.11n HT20 CH 44 5220MHz		10440	44.92	-23.38	68.3	51.45	39.63	15.89	62.05	100	360	P	H
		10440	43.73	-24.57	68.3	50.26	39.63	15.89	62.05	100	360	P	V
802.11n HT20 CH 48 5240MHz		10480	44.11	-24.19	68.3	50.53	39.66	15.94	62.02	100	360	P	H
		10480	43.98	-24.32	68.3	50.4	39.66	15.94	62.02	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5119.36	54.64	-19.36	74	41.35	35.3	11.32	33.33	100	255	P	H
		5130.4	45.27	-8.73	54	31.94	35.31	11.34	33.32	100	255	A	H
	*	5194	97.02	-	-	83.55	35.38	11.41	33.32	100	255	P	H
		5194	89.29	-	-	75.82	35.38	11.41	33.32	100	255	A	H
		5362.74	54.3	-19.7	74	40.48	35.54	11.6	33.32	100	255	P	H
		5371.2	44.54	-9.46	54	30.72	35.54	11.6	33.32	100	255	A	H
		5121.92	54.96	-19.04	74	41.67	35.3	11.32	33.33	100	226	P	V
		5148.8	45.48	-8.52	54	32.11	35.33	11.36	33.32	100	226	A	V
	*	5194	97.24	-	-	83.77	35.38	11.41	33.32	100	226	P	V
		5194	89.85	-	-	76.38	35.38	11.41	33.32	100	226	A	V
		5350.14	53.71	-20.29	74	39.9	35.52	11.61	33.32	100	226	P	V
		5351.4	44.6	-9.4	54	30.79	35.52	11.61	33.32	100	226	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	44.68	-23.62	68.3	51.3	39.61	15.84	62.07	100	360	P	H
		10380	45.25	-23.05	68.3	51.87	39.61	15.84	62.07	100	360	P	V
802.11n HT40 CH 46 5230MHz		10460	45.89	-22.41	68.3	52.38	39.64	15.91	62.04	300	0	P	H
		10460	45.49	-22.81	68.3	51.98	39.64	15.91	62.04	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 - 5250~5350MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 64 5320MHz		5372	54.32	-19.68	74	40.5	35.54	11.6	33.32	108	250	P	H
		5362.1	44.98	-9.02	54	31.16	35.54	11.6	33.32	108	250	A	H
	*	5320	102.21	-	-	88.42	35.49	11.62	33.32	108	250	P	H
		5320	94.91	-	-	81.12	35.49	11.62	33.32	108	250	A	H
		5353.9	58.95	-15.05	74	45.14	35.52	11.61	33.32	105	227	P	V
		5353.7	45.52	-8.48	54	31.71	35.52	11.61	33.32	105	227	A	V
	*	5320	104.67	-	-	90.88	35.49	11.62	33.32	105	227	P	V
		5320	97.27	-	-	83.48	35.49	11.62	33.32	105	227	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 52 5260MHz		7015.015	54.44	-13.86	68.3	66.56	36.8	13.17	62.09	300	0	P	H
		10520	44.8	-23.5	68.3	51.15	39.68	15.98	62.01	300	0	P	H
		7015.015	54.09	-14.21	68.3	66.21	36.8	13.17	62.09	100	360	P	V
		10520	45.17	-23.13	68.3	51.52	39.68	15.98	62.01	100	360	P	V
802.11a CH 60 5300MHz		7065.065	53.48	-14.82	68.3	65.54	36.81	13.29	62.16	300	0	P	H
		10600	44.62	-23.68	68.3	50.81	39.72	16.06	61.97	300	0	P	H
		7065.065	53.43	-14.87	68.3	65.49	36.81	13.29	62.16	100	360	P	V
		10600	44.86	-23.44	68.3	51.05	39.72	16.06	61.97	100	360	P	V
802.11a CH 64 5320MHz		7095.095	53.6	-14.7	68.3	65.62	36.82	13.37	62.21	300	0	P	H
		10640	45.52	-28.48	74	51.64	39.74	16.09	61.95	300	0	P	H
		7095.095	52.9	-15.4	68.3	64.92	36.82	13.37	62.21	100	360	P	V
		10640	44.49	-29.51	74	50.61	39.74	16.09	61.95	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 64 5320MHz		5389.9	54.45	-19.55	74	40.6	35.56	11.6	33.31	106	256	P	H
		5356.9	44.23	-9.77	54	30.42	35.52	11.61	33.32	106	256	A	H
	*	5320	100.09	-	-	86.3	35.49	11.62	33.32	106	256	P	H
		5320	92.8	-	-	79.01	35.49	11.62	33.32	106	256	A	H
		5351.2	56.37	-17.63	74	42.56	35.52	11.61	33.32	100	226	P	V
		5352.4	44.5	-9.5	54	30.69	35.52	11.61	33.32	100	226	A	V
	*	5320	102.15	-	-	88.36	35.49	11.62	33.32	100	226	P	V
		5320	94.84	-	-	81.05	35.49	11.62	33.32	100	226	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		7015.015	53.44	-14.86	68.3	65.56	36.8	13.17	62.09	300	0	P	H
HT20		10520	45	-23.3	68.3	51.35	39.68	15.98	62.01	300	0	P	H
CH 52		7015.015	54.42	-13.88	68.3	66.54	36.8	13.17	62.09	100	360	P	V
5260MHz		10520	44.18	-24.12	68.3	50.53	39.68	15.98	62.01	100	360	P	V
802.11n		7065.065	52.97	-15.33	68.3	65.03	36.81	13.29	62.16	300	0	P	H
HT20		10600	44.62	-23.68	68.3	50.81	39.72	16.06	61.97	300	0	P	H
CH 60		7065.065	54.87	-13.43	68.3	66.93	36.81	13.29	62.16	100	360	P	V
5300MHz		10600	44.05	-24.25	68.3	50.24	39.72	16.06	61.97	100	360	P	V
802.11n		7095.095	53.11	-15.19	68.3	65.13	36.82	13.37	62.21	300	0	P	H
HT20		10640	44.9	-29.1	74	51.02	39.74	16.09	61.95	300	0	P	H
CH 64		7095.095	52.97	-15.33	68.3	64.99	36.82	13.37	62.21	100	360	P	V
5320MHz		10640	44.44	-29.56	74	50.56	39.74	16.09	61.95	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 62 5310MHz		5117.28	54.61	-19.39	74	41.32	35.3	11.32	33.33	111	251	P	H
		5107.36	45	-9	54	31.71	35.3	11.32	33.33	111	251	A	H
	*	5314	96.58	-	-	82.79	35.49	11.62	33.32	111	251	P	H
		5314	88.39	-	-	74.6	35.49	11.62	33.32	111	251	A	H
		5368.3	54.17	-19.83	74	40.35	35.54	11.6	33.32	111	251	P	H
		5350.2	44.59	-9.41	54	30.78	35.52	11.61	33.32	111	251	A	H
		5112.48	53.87	-20.13	74	40.58	35.3	11.32	33.33	105	227	P	V
		5122.88	45.08	-8.92	54	31.76	35.31	11.34	33.33	105	227	A	V
	*	5314	97.78	-	-	83.99	35.49	11.62	33.32	105	227	P	V
		5314	89.91	-	-	76.12	35.49	11.62	33.32	105	227	A	V
		5355.1	56.77	-17.23	74	42.96	35.52	11.61	33.32	105	227	P	V
		5351.2	45.15	-8.85	54	31.34	35.52	11.61	33.32	105	227	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		7025.025	53.82	-14.48	68.3	65.94	36.8	13.17	62.09	300	0	P	H
HT40		10540	45.49	-22.81	68.3	51.81	39.69	15.99	62	300	0	P	H
CH 54		7025.025	54.3	-14	68.3	66.42	36.8	13.17	62.09	100	360	P	V
5270MHz		10540	45.95	-22.35	68.3	52.27	39.69	15.99	62	100	360	P	V
802.11n		7080.08	52.72	-15.58	68.3	64.76	36.82	13.33	62.19	300	0	P	H
HT40		10620	44.01	-29.99	74	50.16	39.73	16.08	61.96	300	0	P	H
CH 62		7080.08	53.99	-14.31	68.3	66.03	36.82	13.33	62.19	100	360	P	V
5310MHz		10620	44.92	-29.08	74	51.07	39.73	16.08	61.96	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 100 5500MHz		5457.84	53.88	-20.12	74	39.97	35.62	11.6	33.31	107	253	P	H
		5466.64	54.97	-13.33	68.3	41.03	35.64	11.61	33.31	107	253	P	H
		5457.84	45.28	-8.72	54	31.37	35.62	11.6	33.31	107	253	A	H
	*	5500	103.1	-	-	89.13	35.67	11.61	33.31	107	253	P	H
		5500	95.49	-	-	81.52	35.67	11.61	33.31	107	253	A	H
		5459.92	55.49	-18.51	74	41.58	35.62	11.6	33.31	103	226	P	V
		5465.36	55.36	-12.94	68.3	41.42	35.64	11.61	33.31	103	226	P	V
		5454.96	45.46	-8.54	54	31.55	35.62	11.6	33.31	103	226	A	V
	*	5500	103.76	-	-	89.79	35.67	11.61	33.31	103	226	P	V
		5500	96.23	-	-	82.26	35.67	11.61	33.31	103	226	A	V
802.11a CH 140 5700MHz		5748.92	55.77	-12.53	68.3	41.35	35.85	11.96	33.39	100	251	P	H
	*	5698	103.11	-	-	88.71	35.82	11.95	33.37	100	251	P	H
		5698	95.47	-	-	81.07	35.82	11.95	33.37	100	251	A	H
		5735.56	58.03	-10.27	68.3	43.6	35.85	11.96	33.38	104	280	P	V
	*	5698	104.82	-	-	90.42	35.82	11.95	33.37	104	280	P	V
		5698	97.52	-	-	83.12	35.82	11.95	33.37	104	280	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a		11000	45.59	-28.41	74	51	39.93	16.45	61.79	300	0	P	H
CH 100		7335.335	46.67	-27.33	74	58.48	36.87	13.49	62.17	100	360	P	V
5500MHz		11000	44.97	-29.03	74	50.38	39.93	16.45	61.79	100	360	P	V
802.11a		11160	45.51	-28.49	74	50.61	40.02	16.72	61.84	300	0	P	H
CH 116		11160	46.23	-27.77	74	51.33	40.02	16.72	61.84	100	360	P	V
5580MHz		11160	46.23	-27.77	74	51.33	40.02	16.72	61.84	100	360	P	V
802.11a		11400	45.48	-28.52	74	50.14	40.15	17.1	61.91	300	0	P	H
CH 140		11400	45.66	-28.34	74	50.32	40.15	17.1	61.91	100	360	P	V
5700MHz		11400	45.66	-28.34	74	50.32	40.15	17.1	61.91	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 100 5500MHz		5439.28	54.81	-19.19	74	40.91	35.61	11.6	33.31	105	251	P	H
		5467.44	54.92	-13.38	68.3	40.98	35.64	11.61	33.31	105	251	P	H
		5459.76	44.51	-9.49	54	30.6	35.62	11.6	33.31	105	251	A	H
	*	5500	101	-	-	87.03	35.67	11.61	33.31	105	251	P	H
		5500	93.35	-	-	79.38	35.67	11.61	33.31	105	251	A	H
		5430.96	54.48	-19.52	74	40.58	35.61	11.6	33.31	104	258	P	V
		5466	54.08	-14.22	68.3	40.14	35.64	11.61	33.31	104	258	P	V
		5458.48	44.56	-9.44	54	30.65	35.62	11.6	33.31	104	258	A	V
	*	5500	101.78	-	-	87.81	35.67	11.61	33.31	104	258	P	V
		5500	93.98	-	-	80.01	35.67	11.61	33.31	104	258	A	V
802.11n HT20 CH 140 5700MHz		5726.92	55.31	-12.99	68.3	40.9	35.84	11.95	33.38	100	250	P	H
	*	5698	101.29	-	-	86.89	35.82	11.95	33.37	100	250	P	H
		5698	93.35	-	-	78.95	35.82	11.95	33.37	100	250	A	H
		5725.8	55.42	-12.88	68.3	41.01	35.84	11.95	33.38	103	280	P	V
	*	5698	102.95	-	-	88.55	35.82	11.95	33.37	103	280	P	V
		5698	95.35	-	-	80.95	35.82	11.95	33.37	103	280	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20		11000	45.22	-28.78	74	50.63	39.93	16.45	61.79	300	0	P	H
CH 100 5500MHz		11000	45.62	-28.38	74	51.03	39.93	16.45	61.79	100	360	P	V
802.11n HT20		11160	46.1	-27.9	74	51.2	40.02	16.72	61.84	300	0	P	H
CH 116 5580MHz		11160	46.56	-27.44	74	51.66	40.02	16.72	61.84	100	360	P	V
802.11n HT20		11400	45.31	-28.69	74	49.97	40.15	17.1	61.91	100	360	P	H
CH 140 5700MHz		11400	46.43	-27.57	74	51.09	40.15	17.1	61.91	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 102 5510MHz		5417.2	54.17	-19.83	74	40.29	35.59	11.6	33.31	100	251	P	H
		5461.52	53.22	-15.08	68.3	39.31	35.62	11.6	33.31	100	251	P	H
		5454.32	44.81	-9.19	54	30.9	35.62	11.6	33.31	100	251	A	H
	*	5512	96.7	-	-	82.73	35.67	11.61	33.31	100	251	P	H
		5512	89.29	-	-	75.32	35.67	11.61	33.31	100	251	A	H
		5760.36	54.83	-13.47	68.3	40.42	35.85	11.96	33.4	100	251	P	H
		5447.92	54.22	-19.78	74	40.31	35.62	11.6	33.31	100	281	P	V
		5469.04	54.1	-14.2	68.3	40.16	35.64	11.61	33.31	100	281	P	V
		5456.4	44.99	-9.01	54	31.08	35.62	11.6	33.31	100	281	A	V
	*	5512	98.13	-	-	84.16	35.67	11.61	33.31	100	281	P	V
		5512	90.4	-	-	76.43	35.67	11.61	33.31	100	281	A	V
		5731.48	55.19	-13.11	68.3	40.78	35.84	11.95	33.38	100	281	P	V
802.11n HT40 CH 134 5670MHz		5433.68	53.71	-20.29	74	39.81	35.61	11.6	33.31	100	246	P	H
		5463.28	54.28	-14.02	68.3	40.34	35.64	11.61	33.31	100	246	P	H
		5441.84	44.6	-9.4	54	30.7	35.61	11.6	33.31	100	246	A	H
	*	5668	96.32	-	-	81.92	35.82	11.94	33.36	100	246	P	H
		5668	89.48	-	-	75.08	35.82	11.94	33.36	100	246	A	H
		5750.92	55.06	-13.24	68.3	40.64	35.85	11.96	33.39	100	246	P	H
		5395.92	54.05	-19.95	74	40.19	35.57	11.6	33.31	100	259	P	V
		5466.32	54.3	-14	68.3	40.36	35.64	11.61	33.31	100	259	P	V
		5446.48	44.67	-9.33	54	30.76	35.62	11.6	33.31	100	259	A	V
	*	5674	98.99	-	-	84.6	35.82	11.94	33.37	100	259	P	V
		5674	91.16	-	-	76.77	35.82	11.94	33.37	100	259	A	V
		5732.76	56.68	-11.62	68.3	42.27	35.84	11.95	33.38	100	259	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 102 5510MHz		11020	45.46	-28.54	74	50.85	39.94	16.47	61.8	300	0	P	H
		11020	44.85	-29.15	74	50.24	39.94	16.47	61.8	100	360	P	V
802.11n HT40 CH 110 5550MHz		11100	44.97	-29.03	74	50.2	39.98	16.61	61.82	100	360	P	H
		11100	45.55	-28.45	74	50.78	39.98	16.61	61.82	100	360	P	V
802.11n HT40 CH 134 5670MHz		11340	46.17	-27.83	74	50.96	40.11	16.99	61.89	100	360	P	H
		11340	45.77	-28.23	74	50.56	40.11	16.99	61.89	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel
WIFI 802.11a (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 144 5720MHz	*	5722	103.87	-	-	89.73	35.84	11.68	33.38	100	251	P	H
		5722	96.48	-	-	82.34	35.84	11.68	33.38	100	251	A	H
	*	5722	104.86	-	-	90.72	35.84	11.68	33.38	101	317	P	V
		5722	97.25	-	-	83.11	35.84	11.68	33.38	101	317	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - Straddle Channel
WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 144 5720MHz		11440	46.27	-27.73	74	50.87	40.16	17.16	61.92	100	360	P	H
		11440	44.92	-29.08	74	49.52	40.16	17.16	61.92	100	360	P	V
Remark - No other spurious found. - All results are PASS against Peak and Average limit line.													

Band 3 - Straddle Channel
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 144 5720MHz	*	5722	101.52	-	-	87.38	35.84	11.68	33.38	110	252	P	H
		5722	94.21	-	-	80.07	35.84	11.68	33.38	110	252	A	H
	*	5722	103.18	-	-	89.04	35.84	11.68	33.38	102	317	P	V
		5722	95.41	-	-	81.27	35.84	11.68	33.38	102	317	A	V
Remark - No other spurious found. - All results are PASS against Peak and Average limit line.													

Band 3 - Straddle Channel
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 144 5720MHz		11440	45.57	-28.43	74	50.17	40.16	17.16	61.92	100	360	P	H
		11440	45.97	-28.03	74	50.57	40.16	17.16	61.92	100	360	P	V
Remark - No other spurious found. - All results are PASS against Peak and Average limit line.													



Band 3 - Straddle Channel
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n	*	5710	97.43	-	-	83.32	35.83	11.66	33.38	105	251	P	H
HT40		5710	89.23	-	-	75.12	35.83	11.66	33.38	105	251	A	H
CH 142	*	5710	99.56	-	-	85.45	35.83	11.66	33.38	115	317	P	V
5710MHz		5710	91.74	-	-	77.63	35.83	11.66	33.38	115	317	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		11420	45.93	-28.07	74	50.56	40.16	17.13	61.92	100	360	P	H
HT40													
CH 142		11420	45.35	-28.65	74	49.98	40.16	17.13	61.92	100	360	P	V
5710MHz													
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		52.31	20.93	-19.07	40	38.14	14.68	1.25	33.14	-	-	P	H
		157.07	16.19	-27.31	43.5	29.83	17.34	2.01	32.99	-	-	P	H
		313.24	21.82	-24.18	46	31.25	20.52	2.78	32.73	-	-	P	H
		632.37	24.21	-21.79	46	27.24	25.76	3.88	32.67	-	-	P	H
		753.62	26.98	-19.02	46	28.8	26.53	4.21	32.56	-	-	P	H
		950.53	29.15	-16.85	46	28.64	27.9	4.71	32.1	100	0	P	H
		30	26.48	-13.52	40	32.97	25.5	1.11	33.1	-	-	P	V
		52.31	29.54	-10.46	40	46.75	14.68	1.25	33.14	100	0	P	V
		621.7	24.68	-21.32	46	27.88	25.67	3.84	32.71	-	-	P	V
		694.45	25.52	-20.48	46	28.25	25.72	4.06	32.51	-	-	P	V
		834.13	28.72	-17.28	46	29.64	27.11	4.21	32.24	-	-	P	V
		948.59	29.47	-16.53	46	28.97	27.89	4.71	32.1	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



For Co-location:

Band 1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5147.2	63.45	-10.55	74	50.35	35.33	11.09	33.32	100	294	P	H
		5150	45.41	-8.59	54	32.31	35.33	11.09	33.32	100	294	A	H
	*	5182	99	-	-	85.84	35.36	11.12	33.32	100	294	P	H
		5182	89.51	-	-	76.35	35.36	11.12	33.32	100	294	A	H
		5145.44	64.47	-9.53	74	51.37	35.33	11.09	33.32	100	225	P	V
		5147.52	45.65	-8.35	54	32.55	35.33	11.09	33.32	100	225	A	V
	*	5176	98.01	-	-	84.85	35.36	11.12	33.32	100	225	P	V
		5176	91.01	-	-	77.85	35.36	11.12	33.32	100	225	A	V
802.BT5.0 CH 39 2480MHz		2483.8	55.68	-18.32	74	50.07	31.99	7.56	33.94	127	316	P	H
		2483.5	47.77	-6.23	54	42.16	31.99	7.56	33.94	127	316	A	H
	*	2479	98.14	-	-	92.53	31.99	7.56	33.94	127	316	P	H
		2479	96.98	-	-	91.37	31.99	7.56	33.94	127	316	A	H
		2490.04	54.57	-19.43	74	48.97	31.94	7.59	33.93	101	138	P	V
		2483.5	46.41	-7.59	54	40.8	31.99	7.56	33.94	101	138	A	V
	*	2479	95.38	-	-	89.77	31.99	7.56	33.94	101	138	P	V
		2479	94.13	-	-	88.52	31.99	7.56	33.94	101	138	A	V



Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11a CH 36 5180MHz&.BT5.0 CH 39 2480MHz		4962	39.17	-34.83	74	55.14	35.19	10.87	62.03	300	0	P	H
		6906	55.99	-12.31	68.3	68.27	36.83	12.88	61.99	121	178	P	H
		7440	42.1	-31.9	74	53.87	36.89	13.45	62.11	300	0	P	H
		10360	46.5	-27.5	74	53.1	39.6	15.88	62.08	100	360	P	H
		4962	39.2	-34.8	74	55.17	35.19	10.87	62.03	300	360	P	V
		6906	61.11	-7.19	68.3	73.39	36.83	12.88	61.99	281	222	P	V
		7440	42.61	-31.39	74	54.38	36.89	13.45	62.11	300	360	P	V
		10360	45.89	-28.11	74	52.49	39.6	15.88	62.08	100	214	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
 = 55.45 (dBμV/m)
2. Over Limit(dB)
 = Level(dBμV/m) – Limit Line(dBμV/m)
 = 55.45(dBμV/m) – 74(dBμV/m)
 = -18.55(dB)

For Average Limit @ 2390MHz:

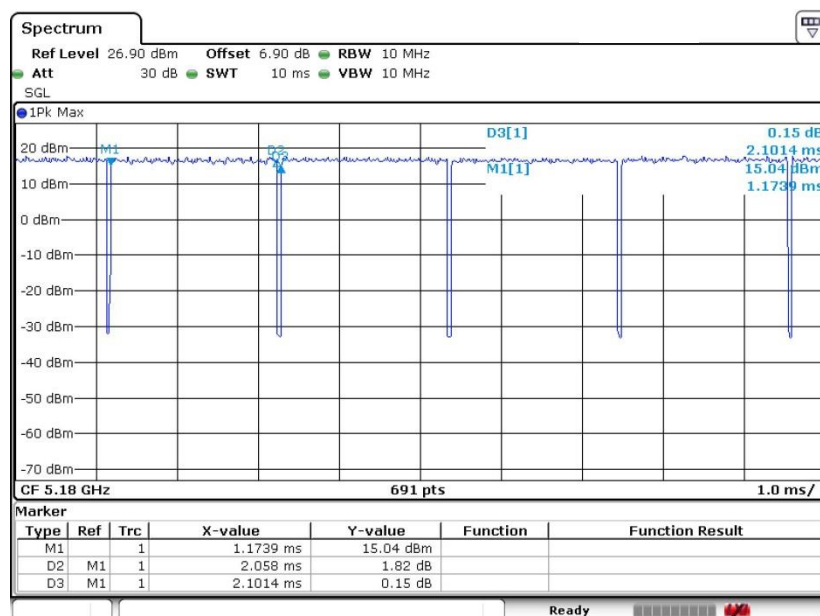
1. Level(dBμV/m)
 = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
 = 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
 = 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
 = 43.54(dBμV/m) – 54(dBμV/m)
 = -10.46(dB)

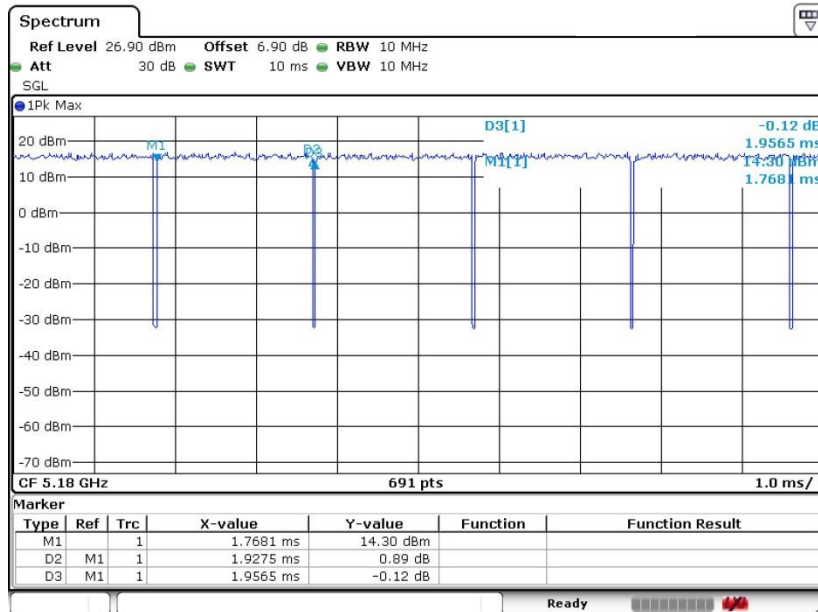
Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	97.93	2.058	0.486	0.51KHz
802.11n HT20	98.52	-	-	10Hz
802.11n HT40	96.32	0.949	1.053	1.1KHz

802.11a



**802.11n HT20****802.11n HT40**